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A new species of the genus *Icius* (Araneae: Salticidae) from the Ogasawara Islands, Japan

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Abstract — A new salticid species of the genus *Icius* is described as *Icius rugosus*, from Mukojima, Anijima and Hahajima Islands of the Ogasawara Islands, Japan. This species resembles the generic type *I. hamatus* (C. L. Koch 1846) but can be distinguished from the latter by genital morphologies in both sexes and male chelicera with ventral wrinkles. Additionally, *I. daisetsuzanus* Saito 1934 is newly synonymized with *Sitticus ranieri* (Peckham & Peckham 1909), as Matsuda (1997) pointed out first. As a result, Japanese species belonging to this genus is only the new species for the present.

Key words — Taxonomy, Anijima Is., Hahajima Is., Mukojima Is., new synonymy, *Icius daisetsuzanus*, *Sitticus ranieri*

The Ogasawara Islands are located 1,000 km South from Tokyo. Up to now, nine salticid species have been recorded from there (Ono 2011). After examining the materials obtained from Mukojima, Anijima and Hahajima Islands of the Islands, we recognized the occurrence of an undescribed salticid species resembling some species of the genus *Icius* Simon 1876. This species is described as a new species in this paper.

Incidentally, from Japan, another species of the genus, *Icius daisetsuzanus* Saito 1934 was known, but it was not a true record of the genus. Details are given below.

Specimens from Anijima and Hahajima Islands were obtained in research projects by Ministry of the Environment (MOE), Japan. Anijima Island: Research on countermeasures against *Anolis carolinensis* invasion on Anijima Island, Chichijima-Islands nature restoration facility. Hahajima Island: Research on the restoration and management technique of Ogasawara forest ecosystem; Research on restoration of the forest ecosystem of the Ogasawara Islands by reducing the impact of introduced species. Specimens from Mukojima Island were obtained in research project by Ogasawara Islands Branch Office, Tokyo Metropolitan Government: Research on vegetative recovery at Mukojima Isls., Ogasawara National Park.

Specimens were preserved in 80% ethanol, and their morphological futures were observed under Olympus SZH10 stereomicroscope. The voucher specimens are deposited in the collection of the Department of Zoology, National Museum of Nature and Science, Tokyo.

The following abbreviations are used: ALE, anterior lateral eye; AME, anterior median eye; PLE, posterior lateral eye; PME, posterior median eye; RTA, retrolateral tibial apophysis.

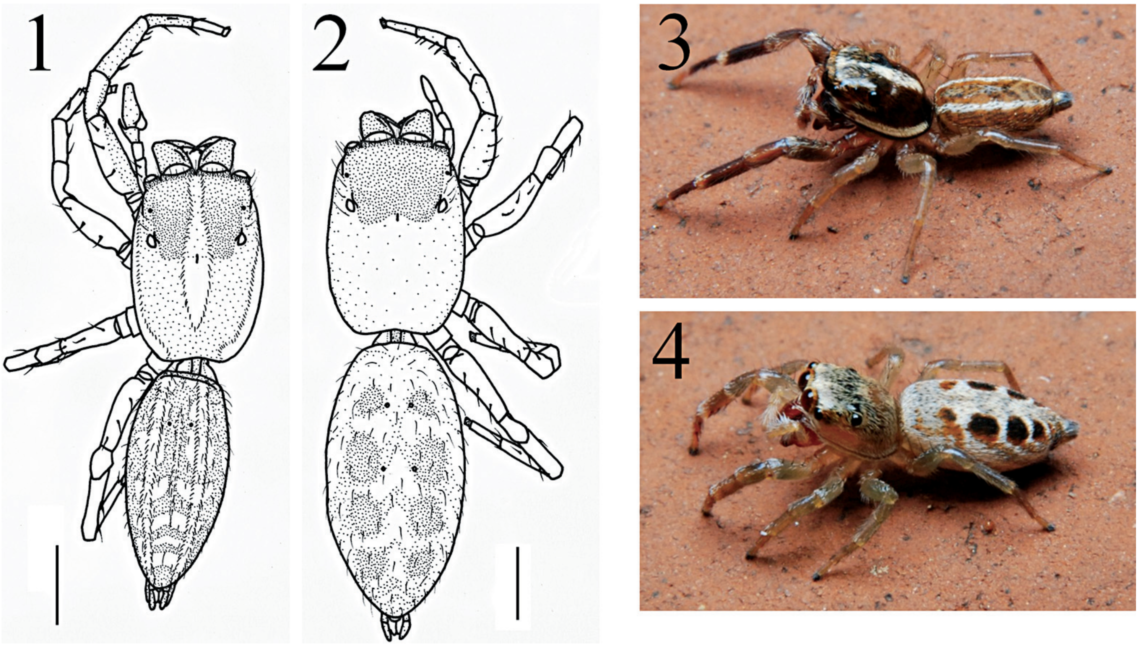
Measurement is given in mm, measurement in parenthesis indicate the range among specimens examined. Measurement of legs is given in the following format: [femur＋patella＋tibia＋metatarsus＋tarsus＝total].

Genus *Icius* Simon 1876
[Japanese name: Hayate-haetorigumo-zoku]

Icius Simon 1876, p. 54; Type species: *I. notabilis* (C. L. Koch 1846) ＝ *I. hamatus* (C. L. Koch 1846), type locality: Naples, Italy.

Remarks. This genus includes not a few dubious species about their placement. Alicata & Cantarella (1993) showed generic type and some species in Euro-mediterranean region, which are obviously closely related. But many other species require a taxonomic revision.

New synonymy of species. In Japan, *Icius daisetsuzanus* Saito 1934 is known from Daisetsuzan Mt., Hokkaido. Judged from the original description, the long leg IV and the morphology of epigyne (Fig. 14) are consistent with those of *Sitticus ranieri* (Peckham & Peckham 1909) which also inhabits alpine belts in Daisetsu Mts. This idea was previously expressed also by Matsuda (1997) and Logunov & Marusik (2001). Therefore, here we consider *I. daisetsuzanus* as a junior synonym of *S. ranieri*. After that, Japanese species belonging to *Icius* is only the following new species for the present.



Figs. 1–4. *Icius rugosus* sp. nov. 1–2, dorsal view (1, male; 2, female); 3–4, habitus (3, male; 4, female). (1, 3, NSMT-Ar 13593; 2, 4, NSMT-Ar 13597.) Scales = 1.0 mm.

Icius rugosus sp. nov.

[Japanese name: Ogasawara-haetori]

(Figs. 1–13)

Type series. Holotype: ♂, Tôkenzan Mt., Anijima Is., Ogasawara Isls., Tokyo, Japan. 7-VI-2014, T. Suguro leg. (NSMT-Ar 13593). Paratypes: 3♂4♀, same data as the holotype (NSMT-Ar 13594-13600).

Other specimens examined. All were collected at the Ogasawara Isls., Tokyo, Japan. 2♂3♀, same data as holotype. 1♀, Chibusayama Mt., Hahajima Is., 20-VI-1997, H. Kitajima leg.; 1♂2♀, South of Ôyama Mt., Mukojima Is., 25-VI-2012.

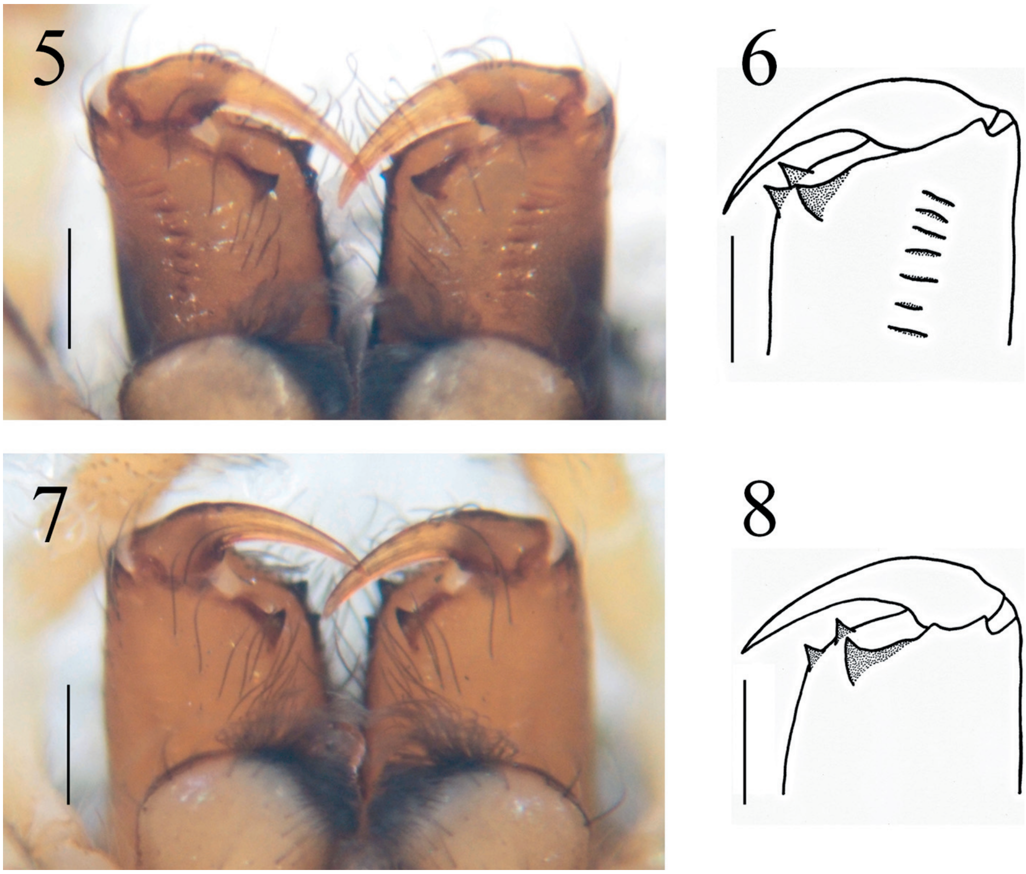
Diagnosis. This species resembles *I. hamatus* (C. L. Koch 1846), the type species of the genus, in male palpal morphology and female markings on abdominal dorsum. However, males of this species can be distinguished from those of *I. hamatus* by the slender part of RTA (Figs. 9–10) and cheliceral wrinkles on venter (Figs. 5–6). Females of this species can be distinguished from those of *I. hamatus* by the shape of internal genitalia (Fig. 12).

Description. *Male* (NSMT-Ar 13593, holotype, Fig. 1). Measurement. Body 4.93 (4.03–4.93) long; carapace 2.38 (2.00–2.43) long; 1.62 (1.34–1.62) wide; 1.02 (0.84–1.04) high; abdomen 2.55 (2.03–2.55) long; 1.36 (1.18–1.36) wide. Eye field: eye row I 1.46 (1.26–1.48) wide; eye row III 1.48 (1.26–1.50) wide; eye row 1.02 (0.84–1.04) long; distance between eye row I and II/length of eye row 0.51 (0.48–0.53); width of eye row I/width of eye row III 0.99 (0.97–1.00); AME diameter 0.45 (0.38–0.47); ALE/AME 0.56 (0.52–0.57); ALE/PLE 0.94 (0.93–1.07); PME/PLE 0.16 (0.15–0.18). Length of legs: I 1.42 + 0.96 + 1.20 + 0.84 + 0.46 = 4.88; II 1.04 + 0.62 + 0.70 + 0.56 + 0.40 = 3.32; III 1.14 + 0.56 + 0.66 + 0.74 + 0.46 = 3.56; IV 1.26 + 0.60 + 0.94 + 0.90 + 0.44 = 4.14.

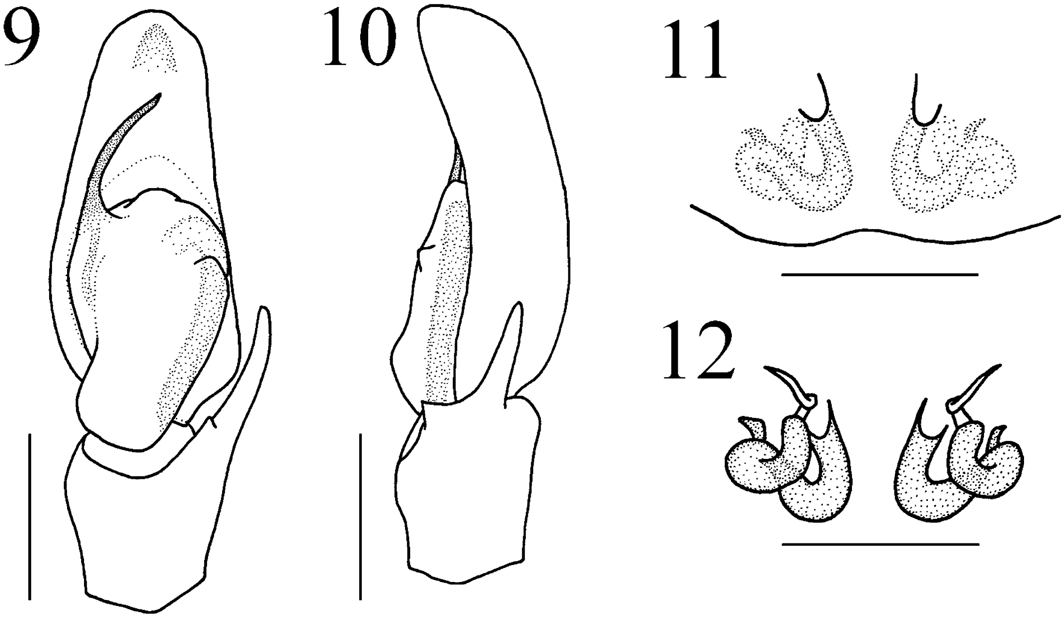
Carapace rather flat, height/width 0.63 (0.59–0.64), with short longitudinal fovea, slightly protuberated on the inside of PLE. Clypeus very low, clypeal height/AME diameter 0.07 (0.04–0.07). Chelicera moderate in length, with two promarginal and one broad retromarginal teeth, bearing wrinkles on venter (Figs. 5–6). Spination of legs as shown in Table 1. Abdomen rather elongate.

Palp (Figs. 9–10). Cymbium rather elongate. Embolus slender, originating at 11 o'clock position of bulb. Genital bulb with posterior projection, with visible gently curved seminal duct on surface. RTA composed with thick basal part and thin distal part.

Coloration and markings (Figs. 1, 3). Carapace mostly dark greyish brown, covered with sparse black and brown hairs, rather bright on anterior part of thorax, bearing white longitudinal stripe made of hairs on the middle and white line made of hairs along clypeus and lateral margins. Eye field dark brown, surrounded by sparse black setae. Eyes surrounded by thick brown hairs. Clypeus bright brown, with black hairs other than white hairs. Chelicera brown, rather darker on dorsum. Labium bright brown. Maxilla and sternum bright greyish brown. Dorsum of abdomen yellowish white, with reticulate markings or chevrons of pigmented part, mostly covered with sparse black and reddish brown hairs, bearing three longitudinal stripes of white hairs: thin one on the middle and paired distinct ones beside it. Venter of abdomen yellowish white, with longitudinal thick grey band on the middle. Spinnerets greyish brown.



Figs. 5–8. *Icius rugosus* sp. nov. 5–6, male chelicerae, ventral view; 7–8, female chelicerae, ventral view. (5–6, NSMT-Ar 13593; 7–8, NSMT-Ar 13597.) Scales = 0.2 mm.



Figs. 9–12. *Icius rugosus* sp. nov. 9–10, male palp (9, venral view; 10, retrolateral view); 11, epigyne; 12, female internal genitalia, dorsal view. (9–10, NSMT-Ar 13593; 11–12, NSMT-Ar 13597.) Scales = 0.2 mm.

Table 1. Spination of legs of *Icius rugosus* sp. nov. (dorsal / ventral; none=no spine, p=prolateral, r=retrolateral).

Leg		Femur	Patella	Tibia	Metatarsus
I	♂	1-1-1,1p/none	none/none	none/1r-1-2-2,1p	none/2-2
	♀	1-1-1/none	none/none	none/2-2-2	none/2-2
II	♂	1-1-1,1p/none	none/none	none/1-2-2,1p	none/2-2
	♀	1-1-1-1p/none	none/none	none/2-2-1p-2	none/2-2
III	♂	1-1-1,1p,1r/none	none/none	none/1-1r-1p-1r-2	1r-2/1-3
	♀	1-1-1,1p/none	none/none	none/1r-1p,1r-2	1r-1/1-3
IV	♂	1-1-1,1r/none	none/none	none/1,1r-1p,1r-2	0-2/1-3
	♀	1-1-1/none	none/none	none/1-1r-1p,1r-2	1r-1/1-3

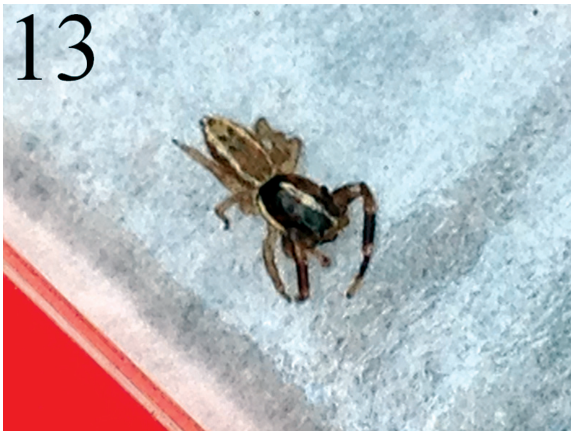


Fig. 13. Male adult of *Icius rugosus* sp. nov. on adhesive trap for Anolis carolinensis in Anijima Is.

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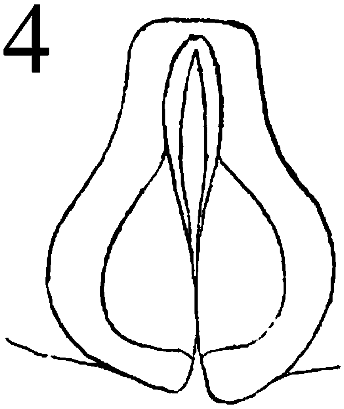

Fig. 14. Epigyne of *Icius daisetsuzanus* Saito 1934 from the original description (pl. 14, fig. 51b from "Saito 1934. Spiders from Hokkaido. Journal of the Faculty of Agriculture, Hokkaido Imperial University, Sapporo, Japan, 33: 267–362."). This species is newly synonymized with *Sitticus ranieri* (Peckham & Peckham 1909) in this paper.

Leg I mostly greyish brown except some bright brown part: dorsum of femur and patella, distal end of tibia and whole of tarsus. Legs II–IV entirely yellowish white. Palp mostly bright brown except black embolus.

Female (NSMT-Ar 13597, one of paratypes, Fig. 2). Body 5.40 (4.88–5.90) long; carapace 2.33 (2.18–2.53) long; 1.60 (1.46–1.74) wide; 1.00 (0.90–1.08) high; abdomen 3.08 (2.70–3.40) long; 1.76 (1.54–2.00) wide. Eye field: eye row I 1.44 (1.32–1.54) wide; eye row III 1.50 (1.34–1.60) wide; eye row 1.00 (0.90–1.08) long; distance between eye row I and II/length of eye row 0.52 (0.50–0.52); width of eye row I/width of eye row III 0.96 (0.96–0.99); AME diameter 0.47 (0.42–0.48); ALE/AME 0.50 (0.48–0.58); ALE/PLE 0.93 (0.92–1.00); PME/PLE 0.20 (0.13–0.20). Length of legs: I $1.06 + 0.80 + 0.80 + 0.60 + 0.36 = 3.62$; II $0.88 + 0.66 + 0.62 + 0.54 + 0.34 = 3.04$; III $1.04 + 0.56 + 0.64 + 0.70 + 0.40 = 3.34$; IV $1.28 + 0.66 + 0.94 + 0.90 + 0.42 = 4.20$.

Carapace rather flat, height/width 0.63 (0.62–0.63), with short longitudinal fovea, slightly protuberated on the inside of PLE. Clypeus very low, clypeal height/AME diameter 0.07 (0.04–0.07). Chelicera moderate in length, with two promarginal and one broad retromarginal teeth (Figs. 7–8). Spination of legs as shown in Table 1. Abdomen rather elongate.

Genitalia (Figs. 11–12). Epigyne with a pair of rather elongate openings. Internal canal twisted, with short glandular duct, visible through epigynal surface.

Coloration and markings (Figs. 2, 4). Carapace mostly dark yellowish brown, covered with sparse black and pale brown hairs, rather bright on middle part of thorax. Eye field dark brown, surrounded by sparse black setae. Eyes surrounded by thick brown hairs. Clypeus bright brown. Chelicera brown. Labium and maxilla bright brown. Sternum yellowish white. Dorsum of abdomen yellowish white, with several chevrons of greyish brown pigmented part, mostly covered with sparse black and white hairs, bearing four pairs of large spots made of hairs: mostly black, peripherally brown. Venter of abdomen yellowish white, with longitudinal thick pale greyish brown band on the middle. Spinnerets greyish brown. Legs entirely yellowish white, rather darker on leg I. Palp entirely bright brown.

Distribution. Japan: Mukojima Is., Anijima Is. and Hahajima Is., Ogasawara Isls., Tokyo.

Remarks. Males and females are considered conspecific because they share similar shapes of retromarginal tooth. No other salticid species occurring at the type locality has such character.

We place this species here for the present, because we can recognize its strong resemblance in general appearances and male palpal morphology to the generic type and some species in Euro-mediterranean region (Alicata & Cantarella

1993): *I. congener, I. crassipes, I. hamatus, I. insolitus, I. simoni* and *I. subinermis*. Though the distribution of *I. rugosus* and those species are far distant, morphological resemblance, that is rather elongate abdomen, male palpal morphology and female abdominal markings, made us decide to place it in this genus.

The ventral wrinkles of male chelicera are possible to be stridulatory organ. Among Salticidae, examples of stridulatory organs are known as combination of carapace and abdomen (Gwynne & Dadour 1985; Maddison 1982), palpal tibia and cymbium (Edwards 1981), and carapace and leg I (Maddison 1987; Azarkina & Foord 2014). However, no examples of cheliceral stridulatory organs have been known from this family. Detailed researches on structure of chelicera and its counterpart, and on courtship behavior are desired in the future.

Incidentally, in the Ogasawara Islands, an invasive lizard species *Anolis carolinensis* is giving serious impact on endemic fauna (Makihara et al. 2004). The new species *I. rugosus* was also found from stomach contents of *A. carolinensis* captured in Anijima Island (MOE 2015). Also, the new species is often found on adhesive traps on trees to capture the lizard (fig. 13), that suggests the arboreality of the new species.

Etymology. The specific name is derived from the wrinkles on male chelicera.

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